

WHAT IS CLAIMED IS:

Clark A

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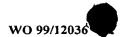
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1. A method of attaching a moiety to a layered silicate surface, said method comprising the steps of:

covalently attaching said moiety to an arginine tag; and contacting said arginine tag with said layered silicate surface.

- 2. The method of claim 1, wherein said arginine tag comprises at least two arginine residues.
- 3. The method of claim 1, wherein said arginine tag comprises from about two to about 100 arginine residues.
 - 4. The method of claim 1, wherein said arginine tag consists of only arginine residues.
 - 5. The method of claim 1, wherein said layered silicate is mica.
 - 6. The method of claim 1, wherein said method further comprises sontacting said layered silicate with a solution containing a sodium salt in a concentration sufficient to remove molecules bound to said layered silicate by non-specific ion exchange.
- 7. The method of claim 1, wherein said sodium salt is present in a concentration of at least 1 mM.
 - 8. The method of claim1, wherein said moiety is a biological molecule.
- 9. The method of claim 8, wherein said biological molecule is a protein.
- 1 10. The method of claim 9, wherein said protein is chemically conjugated 2 to said arginine tag.
- 1 11. The method of claim 9, wherein said protein is fused to the amino or carboxyl terminus of said arginine tag.
- 1 12. The method of claim 9, wherein said protein is recombinantly 2 expressed as a fusion protein with said arginine tag.



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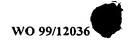
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1 2 13. The method of claim 9, wherein said protein is selected from the group consisting of a DNA binding protein, a molecular motor, an actin filament, a microtubule, a myosin filament, an actin binding protein, and a myosin filament binding protein.

- 14. A surface functionalized for the attachment of organic molecules wherein said functionalization is compatible with physiological sodium salt concentrations, said surface comprising a layered silicate contacted with an arginine tag molecule.
- 15. The surface of claim 14, wherein said arginine tag comprises at least two arginine residues.
 - 16. The surface of claim 14, wherein said arginine tag comprises from about two to about 100 arginine residues.
 - 17. The surface of claim 14, wherein said arginine tag consists of only arginine residues.
 - 18. The surface of claim 14, wherein said arginine tag is covalently joined to a molecule selected from the group consisting of a protein, an antibody, a DNA binding protein, a molecular motor, an actin filament, a microtubule, a myosin filament, an actin filament binding protein, a myosin filament binding protein, a cell surface receptor, a growth factor, a hormone, and a nucleis acid.
 - 19. The surface of claim 18, wherein said molecule is a polypeptide and said polypeptide is fused to the amino or to the caboxyl terminus of said arginine tag.
 - 20. The surface of claim 18, wherein said polypeptide and said arginine tag and comprise a recombinantly expressed fusion protein.
 - 21. A method of orienting a polypeptide on a layered silicate surface, said method comprising the steps of:
- providing a polypeptide covalently linked to an arginine tag; and contacting said arginine tag with said layered silicate surface.

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1	22. The method of claim 21, wherein said arginine tag comprises at least
2	two arginine residues.
1	23. The method of claim 21, wherein said arginine tag comprises from
2	about two to about one hundred arginine residues.
1	24. The method of claim 21, wherein said arginine tag consists only of
2	arginine residues.
1	25. The method of claim 21, wherein said layered silicate surface is mica.
1	26. The method of claim 21, further comprising contacting said surface
2	with a sodium salt in a concentration sufficient to remove molecules bound to said layered
3	silicate by non-specific ion exchange.
1	27. The method of claim 21, wherein said polypeptide is selected from the
2	group consisting of a molecular motor, an actin filament, a microtubule, a myosin filament,
3	an actin binding protein, and a myosin filament binding protein.
1	28. A surface bearing anisotropically oriented proteins, said surface
2	comprising a layered silicate surface contacted with a plurality of proteins, each protein
3	covalently attached to an arginine tag.
1	29. The surface of claim 28, wherein said arginine tag comprises at least
2	two arginine residues.
1	30. The surface of claim 28, wherein said arginine tag ranges from about 2
2	to about one hundred arginine residues.
1	31. The surface of claim 28, wherein said arginine tag consists only of
2	arginine residues.
1	32. The surface of claim 28, wherein said layered silicate is mica.
1	33. The surface of claim 28, wherein said protein is selected from the
2	group consisting of a molecular motor, an actin filament, a microtubule, a myosin filament
3	an actin binding protein, and a myosin filament binding protein.



	i	34. A method of purifying a target molecule from a neterogeneous mixture
	2	of molecules, said method comprising the steps of:
	3	providing a target molecule attached to an arginine tag; and
	4	contacting said target molecule with a surface of a layered silicate
	5	surface; whereby said target molecule binds to said surface.
	1	35. The method of claim 34, wherein said arginine tag comprises at most
	2	two arginine residues.
	1	36. The method of claim 34, wherein said arginine tag comprises from
	2	about two to about one hundred residues.
	Ī	37. The method of claim 34, wherein said arginine tag consists only of
	2	arginine residues.
CO CN	1	38. The method of claim 34, wherein said layered silicate is mica.
	•	So. The memor of claim, and the same in th
	1	39. The method of claim 34, further comprising contacting said mica
	2	surface with a sodium salt.
	1	40. The method claim 34, wherein said contacting comprises flowing
	1	said heterogeneous mixture over one or more mica surfaces.
	2	said neterogeneous inixture oval one of more inica surfaces.
4 =	1	41. The method of claim 34, wherein said contacting comprises combining
	2	said layered silicate with said heterogeneous mixture.
	1	42. The method of claim 41, wherein said method further comprises
	2	removing said layered silicate from said heterogeneous mixture.
	1	43. The method of claim 42, wherein said removing comprises centrifuging
	2	said heterogeneous mixture.
	_	
	1	44. The method of claim 34, further comprising the step of contacting said
	2	layered silicate with a compound selected from the group consisting of a potassium salt, an
	3	arginine, and a poly-arginine, in a concentration sufficient to release said target molecule.

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1	45. The method of claim 34, wherein said target molecule is a fusion
2	polypeptdide comprising a polypeptide fused to said arginine tag at the carboxyl or the
3	amino terminus of said arginine tag.
1	46. The method of claim 45, wherein said fusion polypeptide further
2	comprises a protease recognition site between said argininge tag and said target molecule.
,	47. The method of claim 45, wherein said fusion polypeptide is
1	/
2	recombinantly expressed.
1	48. The method of claim 34, wherein said layered silicate is mica powder.
1	49. The method of claim 48, wherein said mica powder is contained within
2	a chromatography column.
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1	50. The method of claim 34, further comprising the steps of:
2	c) contacting said mica surface with a sodium salt;
3	d) and contacting said layered silicate surface with a compound
4	selected from the group consisting of a potassium salt, an arginine, and a poly-arginine, in
5	a concentration sufficient to release said target molecule.
1	51. An affinity purification device comprising a vessel having a fluid inlet
2	port and a fluid outlet port wherein said vessel is filled with a layered silicate.
1	52. The affinity purification device of claim 51, wherein said layered
2	silicate is mica powder.
1	53. The affinity purification device of claim 51, wherein said layered
2	silicate comprises mica flakes.
1	54. The affinity purification device of claim 51, wherein said vessel
2	contains an aqueous solution comprising sodium salts in a concentration sufficient to
3	remove molecules bound to said layered silicate by non-specific ion exchange.
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Δ	55. The affinity purification device of claim 51, wherein said inlet port

further comprises a frit that is compatible with a syringe.